VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Poultry Litter Storage and Utilization Fact Sheet

Use poultry litter in a manner consistent with this fact sheet or as specified in a nutrient management plan prepared by a Virginia certified Nutrient Management Planner. If poultry litter is sold or given away for land application outside of Virginia, follow this fact sheet or the receiving state's regulations, whichever is most restrictive. If litter is to be use for purposes other than land application to crops (e.g. composting or animal feeding), these uses may be subject to other state laws or regulations. State regulations require that each person who receives litter from a poultry grower or a litter broker must receive a copy of the latest nutrient analysis for that litter. Apply poultry litter so that the nitrogen needs of the crop are not exceeded. For fields which soil test very high (VH) in phosphorus, apply litter based on crop removal of phosphorus for a two-year rotation, as long as nitrogen is not over-applied to the crop following the litter application. Do not apply additional phosphorus to these fields, from any source, during the two year rotation. In all other cases, litter may be applied on fields to supply nutrients based on soil test recommendations. Apply poultry litter as close as possible to planting times or to an actively growing crop or cover crop to ensure proper nutrient utilization and to minimize loss to the environment.

Litter Storage

Litter that is not immediately land applied must be stored properly. If poultry litter needs to be stored prior to use, follow these criteria:

- A litter storage area that provides adequate storage capacity and does not pose undue environmental risk to water quality should be pre-determined prior to receiving a shipment of poultry litter.

- Storage sites for litter may be utilized if the slope is not greater than 7% and the site is 100 feet from surface water, intermittent drainage, wells, sinkholes, and rock outcrops. If stored outside longer than 14 days, the litter must be covered with an impermeable barrier that will resist wind, and be protected from storm water running onto or under it. When applying or using litter, be sure to remove all residue from the storage area and the surrounding ground. Proper cleanup means no waste and protects water quality!

- Store litter in areas where the ground water table is at least 2 feet deep year round. If storage is desired where the water table is as shallow as 1 foot, install an impermeable barrier under the litter. Construct impermeable barriers using at least 12 inches of compacted clay, at least 4 inches of reinforced concrete, or another material of similar structural integrity which has a minimum permeability rating of 0.0014 inches per hour ($1x10^{-6}$ centimeters per second). Do not store litter where the water table is less than one foot deep, even when using an impermeable barrier.

Soil Samples

To determine the proper litter application rate (and to use poultry litter to obtain the best economic benefit), soil sample fields where poultry litter will be applied.

- Soil samples should be taken in late summer or fall. Do not take soil samples immediately after applying lime or fertilizer; wait several months for best results. Send samples well in advance of the need for recommendations.
- Contact your local Virginia Cooperative Extension Service office for soil sampling materials and instructions on proper sampling methods.

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Calculating Litter Application Rate

When soils test very high (VH) in phosphorus, do the following calculations to obtain the proper litter application rate:

1. Determine the N and P_2O_5 requirements (pounds per acre) for the crop from the table below. Determine N need for the current crop (do not forget to credit N from previous legume crops), and P_2O_5 removal for the two-year crop rotation.
2. Divide the N and P_2O_5 requirements by the N and P_2O_5 content of the litter (Pounds per ton from the litter analysis). Remember, use available nitrogen, not total nitrogen. This will give you the amount of litter needed by the crop for each nutrient in tons per acre.
3. If the P_2O_5 application rate is less than the N application rate, then the P_2O_5 rate is the total amount that can be applied. Additional nitrogen will have to be supplied through supplemental applications of commercial nitrogen.
4. If the P_2O_5 application rate is more than the N application rate, then use the nitrogen application rate. The remaining P_2O_5 can be applied to other crops in the rotation.

Typical Crop Nutrient Removal

	Per Unit of Yield			Average	Removal for Given Yield (lb/acre)		
Crop (Unit Yield)	N	P_2O_5	K_2O	Acre Yield	N	P_2O_5	K_2O
Alfalfa (ton)[1]	45	10	45	4	180	40	180
Barley Grain (bu)[3]	1.25	0.375	0.25	80	100	30	20
Barley Silage (ton)[3]	12.5	5	10	8	100	40	80
Corn Grain (bu)	1.1	0.35	0.27	120	130	42	32
Corn Silage (ton)	7.65	4.7	8.3	17	130	80	141
Cotton seed & lint (lbs)	0.04	0.013	0.01	1500	60	20	15
Grain Sorghum (bu)	1	0.41	0.25	100	100	41	25
Hay (ton)[2]	53.3	18	52	3	160	54	156
Hay/Pasture (ton)[2]	60	19	52	2	120	38	104
Pasture					60	30	60
Rye Silage (ton)[3]	16.6	6.67	21.8	6	100	40	131
Soybeans (bu)[1]	3.75	0.88	1.42	40	150	35	57
Wheat (bu)[3]	1.25	0.56	0.61	80	100	45	49

[1]Legumes fix all their required nitrogen. However, they also have the capability to utilize nitrogen as indicated.
[2]Use hay rate if two or more cuttings occur. Use hay/pasture rate if only one cutting occurs and animals are then pastured.
[3]Apply no more than 40 lbs plant available nitrogen per acre in the fall.
To adjust crop removal for your yield, average the highest three yields from the last five years of yield data and multiply this figure by the per unit value for the crop.

Example:

A field in a corn/wheat/beans rotation tests very high (VH) in Phosphorus, so we calculate to determine the proper application rate of poultry litter.

P_2O_5 Crop Removal for 2 year rotation:

1st Crop Corn		2nd Crop Wheat		3rd Crop Soybeans		Crop Removal		P_2O_5 Litter Content (from analysis)		Litter application rate for P_2O_5
42	+	45	+	35	=	122 lbs/ac	÷	65 lbs/ton	=	1.87 tons/ac

N Requirement for current crop: Corn = 130 lbs/ac

Crop Need		N credit from beans (0.5 lb N x 40 bu)	Net N Required		N Litter Content (from analysis)		Litter application rate for N
130 lbs/ac	–	20 lbs/ac	= 110 lbs/ac	÷	37 lbs/ton	=	2.97 tons/ac

Based on these calculations, the litter application rate allowed in this example is 1.87 tons/ac (the P_2O_5 rate). At this rate, the litter will not supply the total N needs of the corn crop. 1.87 tons litter X 37 lbs N/ton = 69 lbs N/ac, which is 41 lbs N/ac below crop need. The remaining 41 lbs/ac N required by the corn crop could be applied, for example, at sidedress time. It is always wise to perform a pre-sidedress nitrate test (PSNT) when using organic sources of nutrients. Check with your regional DCR office or local Extension office for additional help in determining the proper application rate.

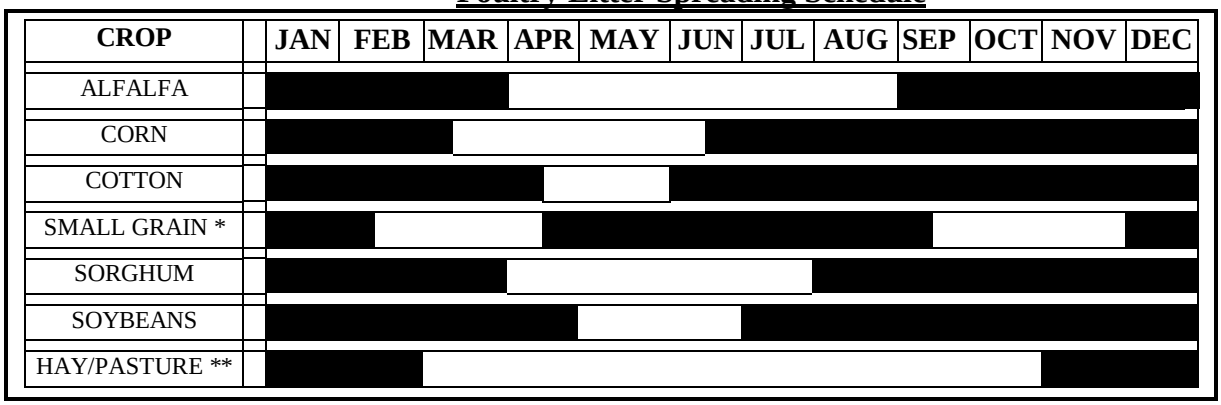
Land Application Conditions & Setbacks

Do not spread litter when field conditions would encourage runoff (i.e. saturated, or snow or ice covered). Application of poultry litter on fields with slopes greater than 15% should be avoided. If pasture and hay fields with slopes greater than 15% are receiving applications of poultry litter, maintain a forage height of at least 3 inches in order to reduce runoff potential. To ensure proper nutrient utilization, apply poultry litter within 30 days of planting or according to the following poultry litter spreading schedule. Apply additional commercial fertilizer (especially nitrogen) as a split application from the poultry litter, either topdressed or sidedressed.

Do not spread litter within the following buffer areas:

- 100 feet from wells or springs
- 50 feet from surface water (25 feet if incorporated)
- 10 feet from agriculture drainage ditches
- 200 feet from neighboring occupied dwellings unless the occupant waives or reduces the buffer in writing
- 50 feet from sinkholes
- 50 feet from limestone outcroppings
- 25 feet from other rock outcroppings

Poultry Litter Spreading Schedule



Do not spread during these periods.

Poultry litter may be applied during these times if soil conditions are acceptable.

*** Apply no more than 40 lbs of plant available nitrogen per acre in the fall**
**** Except for Alfalfa and other warm season grasses.**

Spreader Calibration

Calibrate spreading equipment at least once a year or when litter consistency is obviously different. A plastic tarp or sheet, a bucket, and scales are needed. Lay the tarp smoothly on a flat area. Drive the spreader at a normal speed over the tarp while allowing the litter to begin leaving the spreader at an even, normal rate. Collect all litter spread on the tarp and pour it into the bucket. Weigh the bucket with manure and subtract the empty bucket weight to determine pounds of litter applied to the tarp. Repeat this three times and calculate the average pounds of litter applied to the tarp. Determine the litter application per acre using the following calculation: (Pounds of litter on tarp) X (21.78) / (Area of tarp in ft^2) = Tons/acre

Example: Ave. wt. of litter applied = 5.76 lbs. $\Rightarrow$ $\frac{5.76 \times 21.78}{80\ ft^2}$ = 1.57 Tons/acre
Tarp or sheet area 8' X 10' = 80 ft^2

The load/area method can also be used to calibrate your spreader if you know the capacity of the spreader (tons) and the area covered by a load.

Example: $\frac{\text{Spreader capacity (tons)} \times 43560(ft^2/ac)}{\text{Spread Area (W' x L')}}$ $\Rightarrow$ $\frac{6 \text{ tons} \times 43560}{200' \times 650'}$ = 2 Tons/acre

Additional Information: For more information regarding litter application rate calculations or any other poultry litter management topics, contact your county Extension Service, the regional Department of Conservation and Recreation office or the regional DEQ office.